

**Notice of Allowability**

Application No.

10/789,653

Applicant(s)

LOVOI ET AL.

Examiner

Courtney Thomas

Art Unit

2882

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the amendment filed: 11/17/05.
2. ☒ The allowed claim(s) is/are 1-45.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some\* c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- |   |   |
|---|---|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892)  | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)           |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                | 6. <input type="checkbox"/> Interview Summary (PTO-413),<br>Paper No./Mail Date _____ |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),<br>Paper No./Mail Date _____ | 7. <input type="checkbox"/> Examiner's Amendment/Comment                              |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br>of Biological Material          | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance  |
|   | 9. <input type="checkbox"/> Other _____   |

## DETAILED ACTION

### *Allowable Subject Matter*

1. Claims 1-45 are allowed.
2. The following is an examiner's statement of reasons for allowance:
3. **As per claim 1 and dependent claims 2-22 and 45**, the examiner found no reference in the prior art that disclosed or made obvious a cooling system for a miniature X-ray tube, comprising: a catheter including a coolant delivery head distal relative an anode, for receiving coolant from at least one inflow lumen of the catheter and for delivering a distributed flow of coolant liquid over the anode end of the X-ray tube; the delivery head having a coolant entry end fluidly connected to the inflow lumen and having a wall with a series of orifices for delivery of the coolant liquid toward a proximal direction of the catheter, toward and over the anode end; the orifices being spaced apart and distributed in position so as to spread the coolant liquid over substantially the entire area of the anode end so as to efficiently cool the anode, as recited in independent claim 1.
4. **As per claim 23 and dependent claims 24-40**, the examiner found no reference in the prior art that disclosed or made obvious a cooling system for a miniature X-ray tube comprising: at least two lumens of a catheter being generally coaxial and concentric, including an outer lumen serving as an inflow lumen for coolant liquid and having a closed distal end and an inner lumen serving as an outflow or return lumen for coolant liquid, the x-ray tube being positioned centrally and generally coaxially with respect to the inner lumen and positioned such that coolant liquid from the inflow lumen flows over the anode end of the x-ray tube, and returns in the

proximal direction of the catheter through the inner outflow lumen, as recited in independent claim 23.

5. **As per claim 41 and dependent claims 42 and 43**, the examiner found no reference in the prior art that disclosed or made obvious a cooling system for a miniature X-ray tube comprising: a catheter including a flow channel connecting at least one lumen to an interior of an applicator balloon and fluid communication means in the catheter for providing fluid communication between liquid in the applicator balloon when inflated and the anode end of the X-ray tube, for static cooling of the X-ray tube by a coolant liquid which also inflates the applicator balloon as recited in independent claim 41.

6. **As per claim 44**, the examiner found no reference in the prior art that disclosed or made obvious a cooling system for a miniature X-ray tube comprising: an inflatable balloon near a distal end of a catheter including a liquid flow channel comprising one of multiple lumens and carrying inflowing coolant liquid, the flow channel communicating with the applicator balloon to inflate the applicator balloon with coolant fluid; the liquid flow channel continuing from the applicator balloon to flow liquid over the anode end of the X-ray tube and including an outflow channel comprising another one of the multiple lumens, positioned to carry liquid that has flowed over the anode end in a return direction out of the human body as recited in independent claim 44.

7. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

*Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Courtney Thomas whose telephone number is (571) 272-2496. The examiner can normally be reached on M - F (9 am - 5 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on (571) 272 2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink that reads "Courtney Thomas". The signature is written in a cursive style with a large, stylized "T" and "C".

Courtney Thomas  
Examiner  
Art Unit 2882